

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

1-10. (Cancelled).

11. (Currently Amended) A method of manufacturing a semiconductor device, comprising the steps of:

making a first concavity in a first insulating film of the device;

covering an inside surface of the first concavity and an upper surface of the first insulating film with a first barrier layer for preventing metal diffusion;

burying the first concavity covered with the first barrier layer with a wiring metal;

polishing the device to remove a part of the wiring metal residing higher than a level of the upper peripheral level of the first concavity surface of the first insulating film so as to leave a first metal layer in the first concavity;

applying a solution of an organic substance to the device so as to form a protective film of the organic substance on a surface of the first metal layer for preventing metal diffusion;

forming a second insulating film on the surface of the device, the [[a]] second insulating film contacting the upper surface of the first insulating film from which the first barrier layer is removed, the second insulating film contacting [[and]] the protective film;

making a second concavity simultaneously in the second insulating film and the protective film in a region above the first metal layer;

covering the inside surface of the second concavity the upper surface of the second insulating film with a second barrier layer; and
burying the second concavity covered with the second barrier layer with a second wiring metal layer, the second wiring metal layer contacting the first metal layer.

12. (Previously Presented) The method of claim 11; wherein the organic substance is a triazole compound.

13. (Previously Presented) The method of claim 11; wherein the organic substance is selected from the group consisting of alicyclic alcohol compounds, saccharides, aromatic ring phenol compounds, aromatic ring carboxylic acid compounds, aliphatic carboxylic acid compounds and derivatives thereof, aminopolycarboxylic acid compounds, phosphoric acid compounds, alkanolamine compounds, aromatic ring amine compounds and aliphatic amine compounds.

14. (Currently Amended) A method of manufacturing a semiconductor device, comprising the steps of:

making a first concavity in a first insulating film of the device;
covering an inside surface of the first concavity and an upper surface of the first insulating film with a first barrier layer for preventing metal diffusion;
burying the first concavity covered with the first barrier layer with a wiring metal;

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polishing the device to remove a part of the wiring metal residing higher than a level of the upper peripheral level of the first concavity surface of the first insulating film so as to leave a first metal layer in the first concavity;

applying a solution of a compound onto the surface of the device so as to form a protective film for preventing metal diffusion on a surface of the first metal layer for preventing metal diffusion;

wherein the compound is stannous chloride, stannous borofluoride, stannous sulfate, nickel sulfate, nickel chloride, or nickel sulfamate;

forming a second insulating film on the surface of the device, the [[a]] second insulating film contacting the upper surface of the first insulating film from which the first barrier layer is removed, the second insulating film contacting [[and]] the protective film;

making a second concavity simultaneously in the second insulating film and the protective film in a region above the first metal layer;

covering the inside surface of the second concavity the upper surface of the second insulating film with a second barrier layer; and

burying the second concavity covered with the second barrier layer with a second wiring metal layer, the second wiring metal layer contacting the first metal layer.

15. (Previously Presented) The method of claim 11, wherein the wiring metal is copper.

16. (Previously Presented) The method of claim 11, further comprising washing the device to eliminate particles therefrom, after the polishing.

17. (Withdrawn) An apparatus for manufacturing semiconductor devices, comprising:

a carry-in unit where a substrate cassette receiving a substrate is carried in, the substrate having a metal layer formed in a plurality concavities in an insulating film on the substrates;

a first washing unit where a surface of the substrate is washed;

a processing unit where a solution of an organic substance tending to be bound to the metal layer is applied onto the surface of the substrate to form a protective film on the surface of the metal layer for preventing metal diffusion; and

a carrying unit where the substrate is unloaded from the substrate cassette carried in the carry-in unit, and carried among the units from one to another.

18. (Withdrawn) The apparatus of claim 17, further comprising:

a second washing unit where the substrate in the processing unit is washed with a washing liquid; and

a drying unit in which the substrate is dried.

19. (Withdrawn) The apparatus of claim 18, wherein the first washing unit, the processing unit, the second washing unit, and the drying unit are arranged as a series of processing vessels with the carrying unit transporting the substrate among the plurality of processing vessels.

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20. (Previously Presented) The method of claim 14, wherein the wiring metal is copper.

21. (Previously Presented) The method of claim 14, further comprising washing the device to eliminate particles therefrom, after the polishing.

22. (New) The method of claim 11, wherein the protective film is not substantially formed on the upper surface of the first insulating film.

23. (New) The method of claim 11, wherein the protective film is not substantially formed on the first barrier layer.

24. (New) The method of claim 14, wherein the protective film is not substantially formed on the upper surface of the first insulating film.

25. (New) The method of claim 14, wherein the protective film is not substantially formed on the first barrier layer.

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